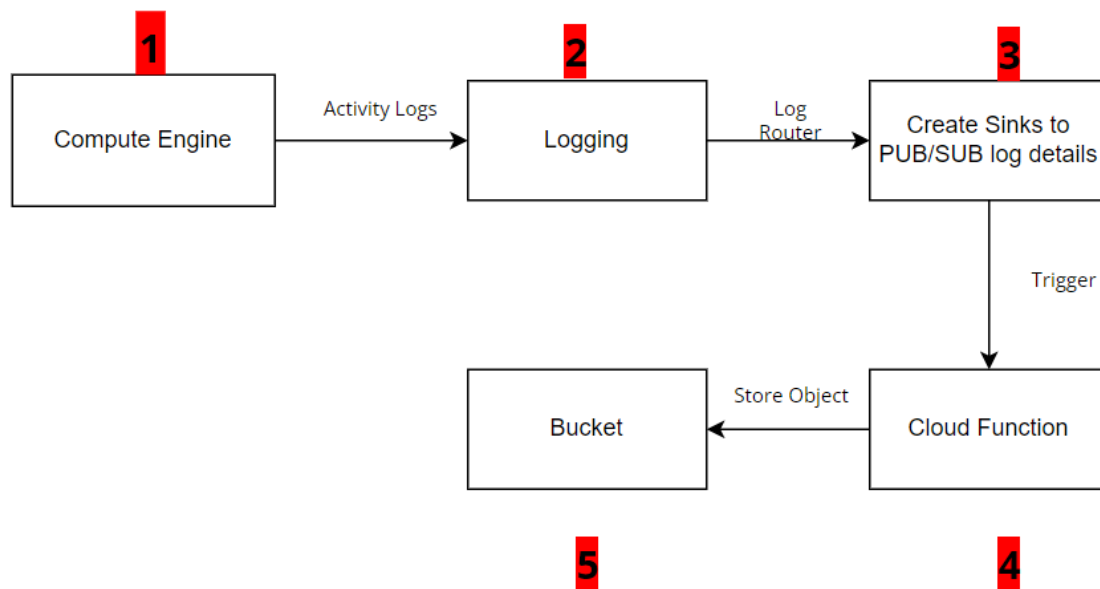


Whenever a vm is stopped the provided information should be stored in the bucket

- Configure the monitoring to get the logs for vm start/stop.
- Write a cloud function with your convenient programming language to capture data about vm start time, end time , ID and Name.
- Configure monitoring to trigger cloud functions based on monitoring.
- Cloud functions should send the data to bucket.

Below GCP services are used:

1. Google Compute Engine(GCE) – For VM instance
2. Logging – Log filters to fetch the start/stop details of VM
3. Sinks – Sinks with PUB/SUB to trigger the cloud function
4. Cloud Function – To fetch the details and store as object in Bucket
5. Bucket – Object stored in bucket



1. Creating GCE instance

<input type="checkbox"/>	Status	Name ↑	Zone	Recommendations	In use by	Internal IP	External IP	Connect
<input type="checkbox"/>	✓	ss-gce-vm	us-central1-a			10.128.0.22 (nic0)	34.71.245.245 (nic0)	SSH ▾ ⋮

2. Logging the VM activity logs with necessary filter to fetch the start/stop VM details

Logs Explorer [REFINE SCOPE](#) [Project](#) [SHARE LINK](#) [LEARN](#)

Query Recent (34) Saved (0) Suggested (3) Library [Clear query](#) [Save](#) [Stream logs](#) [Run query](#)

[Last 1 hour](#) VM Instance +1 activity Severity +2 filters Show query

```

1 resource.type="gce_instance"
2 resource.labels.instance_id="5393791599035967628"
3 logName="projects/gcp-ce-project28/logs/cloudaudit.googleapis.com%2Factivity"
4 protoPayload.methodName="compute.instances.(stop|start)"
5 operation.last=true

```

☒ Log fields ☐ Histogram [Create metric](#) [Create alert](#) [Jump to now](#) More actions

Show Log fields log entries Correlate by Download

SEVERITY TIMESTAMP SUMMARY EDIT

Showing logs for last 1 hour from 12/28/22, 10:20 AM to 12/28/22, 11:20 AM. [Extend time by 1 hour](#) [Edit time](#)

SEVERITY	TIMESTAMP	IST	SUMMARY	EDIT
>	2022-12-28 11:15:07.218 IST	compute.googleapis.com	v1.compute.instances.stop	/zones/us-central1-a/instances/ss-gce-vm sathishk28996@gmail.com audit_log, method: "v1.compute.instances.stop", principal_email: "sathi-
>	2022-12-28 11:19:43.911 IST	compute.googleapis.com	v1.compute.instances.start	/zones/us-central1-a/instances/ss-gce-vm sathishk28996@gmail.com audit_log, method: "v1.compute.instances.start", principal_email: "sathishk2899-

- Using Log Router, route the log file to create Sink and configure the destination to PUB/SUB topic with above log filter
- Before configuring, PUB/SUB topic needs to be created

Topics [+ CREATE TOPIC](#) [DELETE](#)

[LIST](#) [METRICS](#)

[Filter](#) Filter topics

<input type="checkbox"/>	Topic ID ↑	Encryption key	Topic name	Retention	
<input type="checkbox"/>	ss-gce-pubsub	Google-managed	projects/gcp-ce-project28/topics/ss-gce-pubsub	—	⋮

- Trigger cloud function from PUB/SUB topic

Cloud Functions [Functions](#) [CREATE FUNCTION](#) [REFRESH](#) [LEARN](#) [RELEASE NOTES](#)

[Filter](#) Filter functions

<input type="checkbox"/>	Environment	Name ↑	Last deployed	Region	Trigger	Runtime	Memory allocated	Executed function	Authentication	Actions
<input type="checkbox"/>	1st gen	ss-gce-function	Dec 28, 2022, 11:39:35 AM	us-central1	Topic: ss-gce-pubsub	Python 3.8	256 MB	hello_pubsub		⋮

- Below cloud function and bucket has been created

Cloud Functions [Function details](#) [EDIT](#) [DELETE](#) [COPY](#)

[ss-gce-function](#) [1st gen](#) Version 37, deployed at Dec 28, 2022, 8:50:44 ...

METRICS [DETAILS](#) [SOURCE](#) [VARIABLES](#) [TRIGGER](#) [PERMISSIONS](#) [LOGS](#) [TESTING](#)

General Information

Last deployed December 28, 2022 at 8:50:44 PM GMT+5

Region us-central1

Memory allocated 256 MB

Timeout 60 seconds

Minimum instances 0

Maximum instances 3000

Service account [gcp-ce-project28@appspot.gserviceaccount.com](#)

Build Worker Pools —

Container build log [92a74813-a2d8-428c-9b64-643419085e07](#)

Networking Settings

Ingress settings Allow all traffic

VPC connector —

VPC connector egress routing —

EQUIVALENT REST

Cloud Storage

Buckets

Monitoring NEW

Settings

← Bucket details

REFRESH

ss-gce-bucket

Location

Storage class

Public access

Protection

us (multiple regions in United States)

Standard

Not public

None

OBJECTS

CONFIGURATION

PERMISSIONS

PROTECTION

LIFECYCLE

OBSERVABILITY NEW

Buckets > ss-gce-bucket

Test Scenario 1: When VM is started

- VM instance started and triggered the cloud function

VM instances

CREATE INSTANCE

IMPORT VM

REFRESH

START / RESUME

STOP

OPERATIONS

INSTANCES

INSTANCE SCHEDULES

VM instances are highly configurable virtual machines for running workloads on Google infrastructure. [Learn more](#)

Filter

Enter property name or value

?

|||

<input type="checkbox"/>	Status	Name ↑	Zone	Recommendations	In use by	Internal IP	External IP	Connect	
<input type="checkbox"/>	✓	ss-gce-vm	us-central1-a			10.128.0.22 (nic0)	34.70.215.166 (nic0)	SSH	⌵ ⋮

- Cloud function log generated

>	2022-12-28 20:58:30.295 IST	ss-gce-function	qlysyn4e@t0m	VM Instance ID:5393791599835967620
>	2022-12-28 20:58:30.295 IST	ss-gce-function	qlysyn4e@t0m	VM Instance Name:projects/gcp-ce-project128/zones/us-central1-a/instances/ss-gce-vm
>	2022-12-28 20:58:30.295 IST	ss-gce-function	qlysyn4e@t0m	VM Start Time:2022-12-28T15:28:27.331234859Z
>	2022-12-28 20:58:30.295 IST	ss-gce-function	qlysyn4e@t0m	-----
>	2022-12-28 20:58:30.297 IST	ss-gce-function	qlysyn4e@t0m	Function execution took 2324 ms, finished with status: 'ok'

- Text file has been generated and available in the bucket
- Downloading and viewing it

ss-gce-bucket

Location

Storage class

Public access

Protection

us (multiple regions in United States)

Standard

Not public

None

OBJECTS

CONFIGURATION

PERMISSIONS

PROTECTION

LIFECYCLE

OBSERVABILITY NEW

Buckets > ss-gce-bucket

UPLOAD FILES

UPLOAD FOLDER

CREATE FOLDER

TRANSFER DATA

MANAGE HOLDS

DOWNLOAD

DELETE

Filter by name prefix only

Filter

Filter objects and folders

Show deleted data

|||

<input type="checkbox"/>	Name	Size	Type	Created ?	Storage class	Last modified	Public access	
<input type="checkbox"/>	VM_details.txt_20221228_152829	191 B	application/octet-stream	Dec 28, 2022, 8:58:30 PM	Standard	Dec 28, 2022, 8:58:30 PM	Not public	⬇️ ⋮

```
now 62 VM Instance ID:5393791599035967620
now 63 VM Instance Name:projects/gcp-ce-project28/zones/us-central1-a/instances/ss-gce-vm
now 64 VM Start Time:2022-12-28T15:28:27.331234859Z
now 65
now 66
now 67
now 68
now 69
now 70
now 71
now 72
VM_details.txt_20221228_151647
VM_details.txt_20221228_152829
```

Test Scenario 2: When VM is stopped

- VM has been stopped

VM instances CREATE INSTANCE IMPORT VM REFRESH START / RESUME STOP OPERATIONS

INSTANCES INSTANCE SCHEDULES

VM instances are highly configurable virtual machines for running workloads on Google infrastructure. [Learn more](#)

Filter Enter property name or value

✓	Status	Name	Zone	Recommendations	In use by	Internal IP	External IP	Connect
✓	⏸	ss-gce-vm	us-central1-a			10.128.0.22 (nic0)		SSH ▾ ⋮

- Cloud function log has been generated

2022-12-28 21:03:21.948 IST	ss-gce-function qlyicfao3mq	VM Instance ID:5393791599035967620
2022-12-28 21:03:21.948 IST	ss-gce-function qlyicfao3mq	VM Instance Name:projects/gcp-ce-project28/zones/us-central1-a/instances/ss-gce-vm
2022-12-28 21:03:21.948 IST	ss-gce-function qlyicfao3mq	VM Stop Time:2022-12-28T15:33:20.351671373Z
2022-12-28 21:03:21.948 IST	ss-gce-function qlyicfao3mq	-----
2022-12-28 21:03:21.951 IST	ss-gce-function qlyicfao3mq	Function execution took 364 ms, finished with status: 'ok'

- Text file has been generated and available in the bucket

Refresh. Updated just now

ss-gce-bucket

Location us (multiple regions in United States) Storage class Standard Public access Not public Protection None

OBJECTS CONFIGURATION PERMISSIONS PROTECTION LIFECYCLE OBSERVABILITY NEW

Buckets > ss-gce-bucket

UPLOAD FILES UPLOAD FOLDER CREATE FOLDER TRANSFER DATA MANAGE HOLDS DOWNLOAD DELETE

Filter by name prefix only Filter Filter objects and folders Show deleted data

☐	Name	Size	Type	Created	Storage class	Last modified	Public access
☐	VM_details.txt_20221228_152829	191 B	application/octet-stream	Dec 28, 2022, 8:58:30 PM	Standard	Dec 28, 2022, 8:58:30 PM	Not public ⬇ ⋮
☐	VM_details.txt_20221228_153321	190 B	application/octet-stream	Dec 28, 2022, 9:03:21 PM	Standard	Dec 28, 2022, 9:03:21 PM	Not public ⬇ ⋮

- Downloading and viewing the file

```
now 65
now 66
now 67
now 68
now 69
now 70
now 71
now 72
VM_details.txt_20221228_151647
VM_details.txt_20221228_152829
VM_details.txt_20221228_153321
```

```
1 VM Instance ID:5393791599035967620
2 VM Instance Name:projects/gcp-ce-project28/zones/us-central1-a/instances/ss-gce-vm
3 VM Stop Time:2022-12-28T15:33:20.351671373Z
4 -----
```



VM_details.txt_20221_228_153321



VM_details.txt_20221_228_152829

Source code available in below repo:

https://github.com/satizzzzz/SquareShift_Assignment